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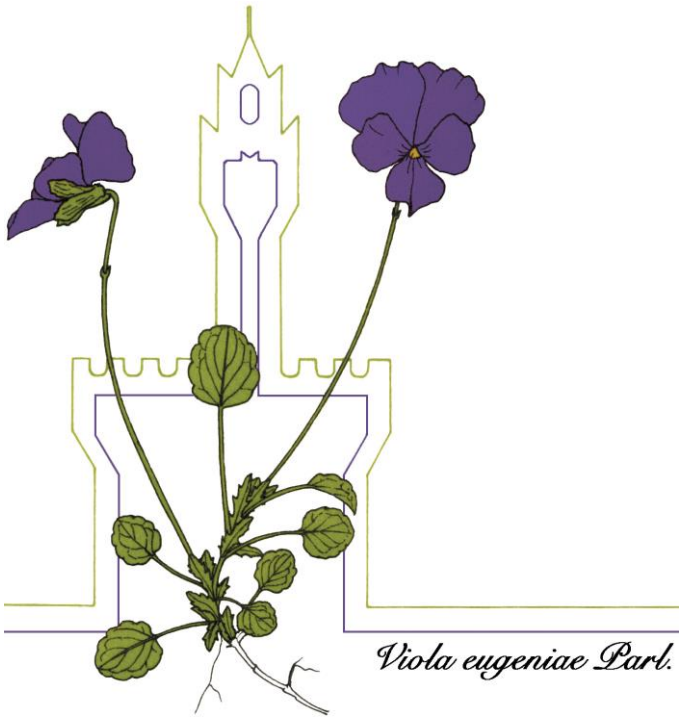

ABSTRACTS

KEYNOTE LECTURES, COMMUNICATIONS, POSTERS

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ORTO BOTANICO UNIVERSITÀ DI PADOVA

DIPARTIMENTO DI BIOLOGIA UNIVERSITÀ DEGLI STUDI DI PADOVA

ICPPR International Commission for Plant-Pollinator Relationships

ABR active botanicals research

DemBiotech Science-based natural ingredients

IUBS

BIOS LINE

CENTRO STUDI TERMALI PIETRO D'ABANO

PICCIN

Biolchim Concimi speciali

ZANICHELLI

2.3 = Marine litter and psammophytes: a case study in the Migliarino-San Rossore-Massaciuccoli Regional Park coastal sand dunes

Alessio Mo, Marco D'Antraccoli, Gianni Bedini, Daniela Ciccarelli
Department of Biology, University of Pisa, Via L. Ghini 13, 56126 Pisa, Italy

Coastal sand dunes are one of the most impacted ecosystems in the world (1). They host various habitats of Community interest under the Habitats Directive 92/43/EEC but are profoundly affected by pollution and waste management, even within protected areas. The factors that define the amount, type and distribution of beach litter are complex and relate more to human intervention and natural variables.
This work aims to analyse the composition, abundance and distribution of marine litter within a protected area in two different chronological windows, i.e. before and after the bathing season. We also attempted to verify whether the presence of waste could alter the coverage of the psammophilous vegetation.
The protected area examined in this project is the Migliarino-San Rossore-Massaciuccoli Regional Park (Tuscany, Italy), where we selected three dune sites stretching along the coastline with a North/South gradient: Lecciona (2 Km^2), Bufalina (1 Km^2) and Calambrone (1 Km^2), respectively. We adopted a stratified random sampling design, using permanent multiscale squared-plots of 16 m^2, with two nested plots placed at a fixed corner of 4 m^2 and 1 m^2, respectively. Each site was divided into same-area strata with a spatially optimised algorithm. Inside each layer two points were randomly selected, corresponding to the field plots; overall, a total of 22 plots were sampled. Sampling took place in two sessions, one in May and the other one in November.
The data collected were the total percentage coverage of litter and the individual coverage of each type of litter for each plot. Classification of marine litter followed the directives of the "Master List of Categories of Litter Items", a list drawn up by the Joint Research Centre (JRC) of the European Commission based on several classification protocols (2). At the same time, we censused the plant species in each plot and measured their total percentage coverage at each investigated spatial scale.
We compiled a litter × plot matrix with the percentage of coverage of each type of waste found in the plots at the three spatial scales and in the two periods. The PERMANOVA analysis of the matrix with 4 factors (month, site, layer and plot area) highlighted that the interaction term month × site explained significantly ($P < 0.001$) the variance in the composition of waste at the plot level. NMDS analysis (non-metric multidimensional scaling) showed that the categories most significantly related to the variability between plots were the following: "plastic fragments less than 2.5 cm (G78)" and "plastic fragments between 2.5 and 50 cm (G79)". These two types of litter showed contrasting patterns over time: G78 increased from June to November, G79 decreased in the same period. Multivariate analyses were carried out using the software PRIMER v.7 (3) and PERMANOVA+ (4).
The diachronic study of the relationship between area and the number of litter categories, carried out using the Arrhenius power law equation (5), showed that in Lecciona and Bufalina there was in November a greater growth in types of litter as the area increased in respect to the first sampling period, while in Calambrone there were no differences. According to Pearson correlation test, temporal turnover of litter categories, quantified partitioning β-diversity following (6), and the total percentage coverage of vegetation resulted inversely correlated ($cor = -0.44$, $P = 0.038$).
In conclusion, artificial polymer materials were found to be the dominant waste type (85%) at the three study sites examined, two of which were characterised by an increase in waste after the bathing season. In the third site, however, probably due to regular manual cleaning actions, no differences were found. Where vegetation is more abundant, the total number of litter categories tends to be more stable across the seasons, suggesting that psammophytes are a relevant biotic component to be considered in the analysis of spatio-temporal dynamics of coastal litter.

1) Ciccarelli D., 2014. Environ. Manag. 54, 194–204
2) Galgani F., Hanke G., Werner S., et al. (2013) JRC Scientific and Policy reports
3) Clarke K., Warwick R. (2001). Change in marine communities: an approach to statistical analysis and interpretation Ed. 2. PRIMER-E, Plymouth
4) Anderson M.J., Gorley R.N., Clarke R.K. (2008). PERMANOVA+ for PRIMER: Guide to software and statistical methods. PRIMER-E, Plymouth
5) Arrhenius O. (1921) J Ecol, 9, 95-99
6) Baselga A. (2010). Glob Ecol Biogeogr, 19, 134-143